

SMS Based Alert System for Shoplifting

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Abstract — Shoplifting has long been a problem for the retail industry and there can also be store-related problems due to financial losses. Traditional forms of security, like closed-circuit television cameras and human security personnel, do not necessarily guarantee instantaneous alerts and are continuously monitored. In view of the above, the current project aims to develop a simple and inexpensive SMS alert system capable of detecting suspicious activities movement in the shop and immediately notify the proprietor. The project is made by utilizing the following components: Arduino UNO, microwave motion sensor, GSM module, relay module, buzzer, LED indicators, and wireless transmitter/receiver modules. When the unusual activity is detected, the system activates the local alarms and sends an SMS to the shop owner. The proposed system is easily installable, economical, and appropriate for small and medium-scale retail business operations. III. PROBLEM STATEMENT Retail stores suffer losses due to unauthorized movement and unnoticed shoplifting activities. Ongoing monitoring systems lack instant alert capability or require constant human oversight. There is a need for a low-cost, automated security system capable of detecting suspicious activity and notifying the shop owner immediately through SMS.

Keywords – Shoplifting, Arduino UNO, GSM, Microwave Sensor, Security System, SMS Alert System.

INTRODUCTION

Shoplifting has become one of the most frequent problems in business environments all around the world. As businesses in this country continue to grow and the movement of the people rises, so has the potential risk of items being stolen from the store. Shop lifting which results in financial losses and also influences rates, safety costs, employee work efficiency, and business operations. In most situations, small and medium business stores get mostly affected because they don't have the financial resources to invest in high-priced safety solutions such as advanced CCTV systems, AI-assisted systems, or special security guards. Thus, with increasing

need comes the need for an effective, reliable, and easily deployable technological solution which can enable store owners to get alerts instantly about potential shop lifting incidents. In recent years, one such effective strategy which has come up is SMS alert systems used in shop lifting. These systems which utilize low-priced sensors paired with mobile communication technologies instantly alert store owners whenever the slightest sign of shop lifting is noticed. An SMS alert system about shop lifting is based on a rather simple yet highly effective principle: detect irregular movement, send an alert, which proceeds to alert the store owner or security personnel via a mobile message. The first major advantage of this system is its ease of usage and availability to everyone. Unlike applications dependent on internet technologies or advanced security solutions, SMS alert systems can work on relatively simple mobile communication networks and can therefore be accessed by stores situated in urban or rural settings. Furthermore, even in most remote places with minimal internet penetration or internet availability at all, mobile communication enabling SMS alert systems most likely work just fine shoplifting events can be responded to immediately before damage escalates.

LITERATURE SURVEY

The research work titled "Theft Detection and Alert System Using PIR Sensor" by Tanvi Dinkar Patil and Mayuri Manik Mali (April 2025) discusses a low-cost and reliable security solution designed to minimize theft. The system works by using a PIR sensor to detect human movement within a protected area and take quick action when unusual activity is identified. This security setup is developed using a microcontroller such as Arduino Uno or ESP8266 and includes key components like a GSM module, GPS unit, LCD display, buzzer, and a mobile application. Whenever motion is sensed, the system activates an alarm, displays an alert message, and sends an instant SMS notification to the user. With the help of GSM or Wi-Fi connectivity, users can monitor the system remotely and receive real-time updates, ensuring continuous safety when no one is from the monitored location [1].

The research work titled “Theft Alert Call and SMS” by P. Preethi and V. Ragasri (published on 3 July 2025) presents a simple and cost-effective security alert system designed for everyday use. This system uses a PIR sensor connected to an Arduino Uno to detect human movement. When unauthorized motion is sensed, the Arduino triggers a GSM module to send SMS alerts and make phone calls to the owner, even if there is no internet connectivity. As the system is easy to use, energy efficient and easy installation, this setup is well suited for homes, shops, offices, vehicles, and rural areas. The study also notes limitations such as false alarms and dependence on mobile network availability, while suggesting future enhancements including camera integration, GPS tracking, multiple sensors, cloud monitoring, and machine-learning-based detection [3].

The research work titled “Structure of an Arduino Based Home Security Automation System” by Mohit Ghai and Ruchi Gupta (published on 2023) presents a straightforward and effective home security solution developed using Arduino technology. The system uses a PIR sensor to detect human movement and an LDR to monitor variations in light intensity. When unusual activity is identified, LEDs and a buzzer are activated to provide immediate visual and audio alerts within the house. The Arduino Uno serves as the central processing unit, continuously analyzing inputs from the sensors and responding promptly to any abnormal conditions. Designed around basic IoT principles, the system emphasizes low in cost, minimal power usage, and ease of installation. The study demonstrates that integrating simple sensors with an Arduino platform can successfully automate home security functions and significantly enhance household safety [5].

The research work titled “Power Theft Detection with Short Message Service Alert and Auto Shutdown,” presented by G. Srivalli and Banthi Sampreeti Reddy (published on 30 November 2023) focuses on addressing the growing issue of electricity theft. Several studies have explored the use of low-cost embedded systems to improve security and reduce losses caused by theft and unauthorized activities. One such study focuses on a power theft detection system that continuously observes electricity consumption using current and IR sensors. Any unusual pattern, such as illegal connections or meter tampering, is identified instantly. Once such activity is detected, the system sends an alert through SMS using a GSM module and disconnects the power supply automatically by using a relay unit [6].

METHODOLOGY

A. Problem Statement

Retail stores frequently suffer losses due to unnoticed shoplifting activities. Existing security methods either depend heavily on human supervision or involve expensive equipment that is not affordable for smaller shops. Continuous monitoring is difficult, especially with limited staff. Therefore, there is a requirement for a low-cost, automated setup that can detect suspicious movement inside a shop and immediately notify the owner without requiring constant human involvement.

B. Proposed Method

The proposed system is designed to detect suspicious movement and alert the shop owner instantly through SMS. An Arduino UNO is used as the major controlling device in the system. It is accompanied by a microwave motion sensor fixed in places like shelves or entrance points. If there is unusual motion detected, this sensor gives a signal to the Arduino.

The Arduino receives this signal and triggers the GSM module to send an SMS notification to the number registered with the service. Additionally, the relay module turns on the devices such as the buzzer and the LED to offer local notifications within the store.

The system can be adjusted depending on the need to reduce false alarms. In addition, the system is reliable because it does not need internet connection. This makes the system easily deployable in such shop environments.

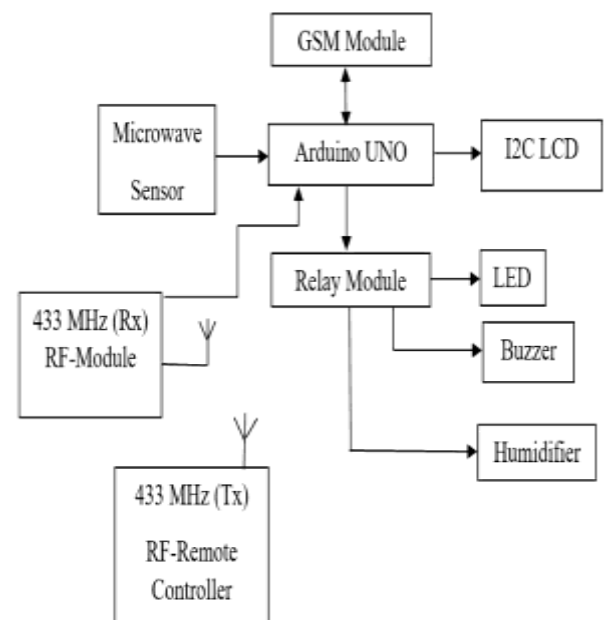


Fig 1. Block diagram

The above figure shows the block diagram of SMS Based Alert System for shoplifting. Here we used a GSM Module 800C which can send the call and msg alerts to the owner on real, Arduino UNO is the control unit of the system which can receive the signal from the GSM Module and activates the LED, Buzzer and Humidifier. In our model we use Microwave sensor which can detect the suspicious movement and it ranges from 320 – 340GHz and we use 433 MHz receiver and transmitter if the system is monitor remotely. And we use a relay module which act as switch. LED and Humidifier is used as visual alerts, and Buzzer is used for sound alerts.

Flow Chart

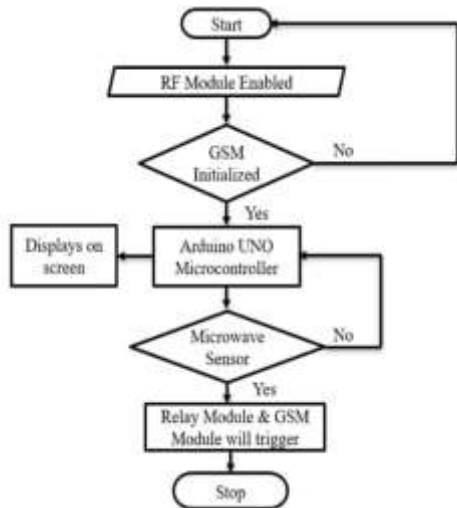


Fig 2. Flow chart

The above figure shows the working design of the system. After we turn on the power button, all the components are activated. The RF module is switched on, search if there is any wireless signal present, then the GSM module searches for the network. If the GSM module will get the network, it is started initializing otherwise it is continuously monitoring the network. When the GSM is initialized, it sends the signal to the Arduino uno. The uno will receive the signal and monitor it. If there is any command received by the Arduino, it will be displayed on the screen, then the microwave sensor will continuously monitor the movement, if there is any suspicious moment it will send the signal to the RF module if there is no movement it will continuously check. The signal received by the RF module will send alerts to the owner. The alerts are SMS and calls, during the same time, LED, Buzzer, and Humidifier turn on.

Results and Discussion



Fig 3. Overview of the Project

The image above, labelled Fig 3. The SMS-Based Alert System for Shoplifting is an electronic security system designed to detect shoplifting activities and immediately alert the shop owner or security personnel through SMS notifications. The system uses sensors to monitor movements or object removal and communicates alerts using a GSM module.



Fig 4. System Initialization

The System Initialization stage is the starting process that takes place as soon as the SMS Based Shoplifting Alert System is switched on. During this stage, all hardware components, sensors, and communication modules undergo a series of startup procedures to make sure the system is fully prepared for operation.

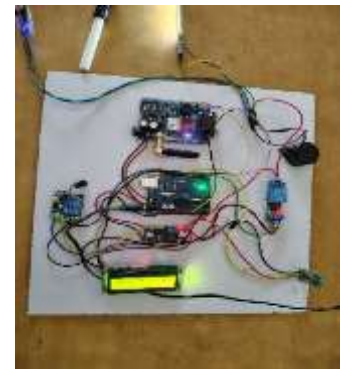


Fig 5. Suspicious Movement Detected

The SMS-Based Shoplifting Alert System detects suspicious movement in a shop using a microwave sensor and immediately alerts the owner through an SMS using a GSM module.



Fig 6. Output Display

The illustrated This component is a wireless motion detection unit that uses a microwave sensor to sense movement and transmit a signal to the main system.



Fig 7. SMS Alert to Owner



Fig 8. Call Alert to Owner

The system triggers repeated SMS and call alerts indicating suspicious movement inside the shop, urging the owner to take immediate action.

CONCLUSION

In general the SMS Based Alert System for Shoplifting which is an outstanding system which gives an automatic SMS and Call alerts to the shop owner mobile when the object is identified by the microwave sensor. This is an dependable approach and realistic, for retail security which gives strengthens. The basic sensors, GSM module, and microcontroller by integrating all these elements, an immediate communication curve is developed that provides immediate information to the owner at the time when the suspicious activity occurs in the store. This immediate alert system proves helpful in minimizing response time, and thus, of preventing theft and protecting valuable products, which is an important aspect, the system is understandable, economical, and requiring minimal effort or time to maintain, optimizes it especially for small shops that cannot afford an expensive system of monitoring by using high-cost electronics in almost all cases. Another basic advantage of using this system is that it is quite easier to install. This SMS-based system of shoplifting can also be developed according to the size of the store, security requirements, and position of products being sold in different shopping store surroundings that are ensured and completely adopt by adopting it. These systems also develop an environment by safe shopping by minimizing

potential threats of store robbery and also help storeowners in their products in an unmistakable manner.

In short, SMS based warning system is a low-cost and highly effective mix of speed, for simplicity and correct price. This system is a simple, fast with reduced cost solution, which enhances shop security. Help shop owner to reduce theft for a betterment of control over his or her goods and overall shop safety. Where here the microwave sensor, detects the movement of object properly or accurately, then it goes to Arduino UNO, and this will give commands to GSM module, this GSM module will give real time message alerts, and call alerts with quick response and reduced losses. The LED and buzzer, which will give alerts immediately inside the shop, where here the theft can scare away intruders and will give alerts immediately. The wireless communication system setup is arranged within the shop layout. Thus, these technology will prove to be effective, expandable method to make system flexible and convenient. The designed method, will be arranged and can be modified by adding some additional features into it, like buzzer, LED indication, and spraying humidifier or siren, which is arranged by relay, all this indication are been done. Since, this system is specifically designed for small and medium sized shop stores, because here it will not require to arrange some highly expensive equipment, and proper detailed installation. It is a reliability, simplicity, and reduced maintenance method, make way to act a highly useful tool, to enhance or improve overall shop safety. This method is best, for whom are unable to arrange highly expensive and advanced systems like, cctv etc. In future will be processed furthermore by adding mobile control, camera, and IT system to make, even convenient. Thus, overall, this system will give a proper way to enhance shop safety.

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